Collaborative Decision-Making in Emergency and Disaster Management

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Decision-making in emergencies requires non-traditional approach and tools characterized by non-hierarchical structure and flexibility. The dynamic environment of disasters makes it imperative to invest in inter-sector and inter-agency cooperation and coordination. Focusing on the Emergency Management Assistance Compact's (EMAC) response to Hurricanes Katrina and Rita in 2005, this article examines the decision-making structure of the agreement. EMAC is an inter-state mutual aid agreement that facilitates sharing of resources during and after disasters. While EMAC's overall decision-making performance was relatively satisfactory and flawless, investment in communication, trust-building, and eradication of inter-agency value differences and discrepancies is imperative.

Keywords: Emergency management, decision-making, collaborative decision-making, EMAC, disaster management networks

INTRODUCTION

The increase of frequency and scope of natural and human-made disasters during last decades made it clear that traditional emergency, crisis, and disaster management tools have proved to be ineffective. In this regard, traditional approaches characterized by hierarchy and centralization have been replaced by decentralized emergency management systems. This change was especially fostered by the need to collaborate during response to and recovery from extreme events and catastrophic disasters. Collaborative emergency management, though, which focuses the application of networked coordination, collaboration and partnerships in crisis, disaster, and emergency settings emphasizing decentralized and flexible structure along with relevant administrative and service delivery adjustments, brings its own distinctive issues to the table. One of such issues is collaborative decision-making.

Collaborative decision-making has been widely addressed by scholars (Hills, 2004; Raiffa, Richardson, & Metcalfe, 2002; Turoff, White, Plotnick, & Hiltz, 2008); its application in emergency management, however, has received limited attention. Collaborative decision-making can be defined as combination and utilization of resources and management tools by several entities to achieve a common goal.

The focus of this article is collaborative decision-making in emergency and disaster management, which will be analyzed in the context of the Emergency Management Assistance Compact's (EMAC) response to the catastrophic disasters Hurricanes Katrina and Rita in 2005. EMAC is a mutual aid agreement aiming at partnership between states during natural and human-made disasters. The agreement requires involvement of the states, which inevitably should start from the decision-making stage. The states and the affected local governments as well as organizations responding to disasters are stakeholders of the collaborative decision-making process.

This article examines the following research questions: How did collaborative decision-making work in EMAC during Hurricane Katrina and Rita response operations? What are the challenges and opportunities of collaborative decision-making based on the EMAC case? To answer the questions, the literature on collaborative emergency management and collaborative decision-making was reviewed. A theoretical framework for collaborative decision-making in emergency and disaster management was developed. The article describes the current EMAC system and the

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decision-making pattern analysis of participating agencies in response operations after the Hurricanes Katrina and Rita. Relevant data was primarily derived from the content analysis of NEMA/EMAC 2005 after-action report. The article concludes by recommendations and conclusion sections.

COLLABORATIVE DECISION-MAKING IN EMERGENCIES AND DISASTERS

For better grasp of the *collaborative decision-making in emergencies* term, it is important first to understand what collaboration means in the context of emergency management. With the increased scope and severity of human-made and natural disasters over last decades it has become important to revise traditional emergency management tools and methods characterized by centralization and hierarchy-based policies (Aldunate, Pena-Mora, & Robinson, 2005; Bier, 2006; Perrow, 1984). Though these policies favor centralized coordination for better results, this has not been possible in practice in several cases such as September 11, 2001, terrorist attacks and Hurricane Katrina disasters, which resulted in embarrassing failures (Bier, 2006; Ward & Wamsley, 2007).

One of the most important reasons for the failures has been insufficient organizational capacity and unpreparedness of the organizations involved in emergency response operations (Kapucu & Van Wart, 2006). This has led to revision of traditional emergency management tools with the increased focus on collaboration as a solution or supportive method.

Collaborative practices across different programs, policies, and spheres is a relatively new phenomenon despite its roots going back centuries (Kamensky, Burlin, & Abramson, 2004). Being a novelty for many leaders, managers, and decision-makers, the tool has been the natural result of several innovations and developments in spheres that made collaboration possible and viable to deliver better services to citizens. Klitgaard and Treverton (2004) identify some of these reasons as technological innovations, market dominance as a societal power, service delivery shifting from centralized and hierarchical to decentralized style of management, and increased inter-relatedness of different spheres that were hardly related previously.

According to Kamensky et al. (2004), "[c]ollaboration occurs when people from different organizations produce something together through joint effort, resources, and decision-making, and share ownership of the final product or service" (p. 8). In other words, the end product and effectiveness are the most important aspect of collaborations. The scope and nature of collaborations, however, varies in accordance with the needs and goals of collaborating parties. Kamensky et al. (2004) put coordination and cooperation on one, and networks and partnerships at another end of the collaboration continuum. Different types of collaboration exist across the continuum based on the level of commitment in terms of items specified in the definition above. Thus, while the former requires the lowest, the latter requires the highest level of commitment. Depending on the level of commitment from different parties, the strength and benefits of each involvement varies. While certain knowledge-based initiative may be accomplished through cooperation, large-scale involvements requiring commitment of resources and information exchange, for example, may be only effective and possible through collaboration at the partnerships and networks level (Agranoff, 2006). In this regard, the level at which organizations will collaborate is basically the result of capacity and goal assessment by respective entities.

Different sectors and fields have already been exposed to the collaboration phenomenon. Emergency and disaster management is one of the fields that has addressed collaborations and partnerships over last years. One of the reasons for this, specifically in the US context, was the failures behind preventing the September 11, 2001, terrorist attacks and responding to the Hurricane Katrina disaster. The lack of comprehensive intelligence collaboration in the first case (The 9/11 Commission, 2002), and emergency response and recovery collaboration in the second, are examples urging to address more effective and more responsive emergency management networks ("connecting the dots").

Apparently, collaborative emergency management has become an inevitable, let alone indispensable, tool to deal with complex extreme events over last years (Waugh & Streib, 2006). When managing disaster response and recovery operations in such large-scale emergency situations like Hurricane Katrina, for example, involvement of several organizations from different sectors and jurisdictions may be problematic if they are not coordinated effectively. This, however, requires comprehensive intra-organizational and inter-organizational mechanisms to address the issue, which is closely related to capacity of organizations to handle a problem at hand. While many capacity problems can be observed across several practices concerning emergency management, decision-making issue requires special attention. The next section focuses on decision-making in emergencies with its examination in the context of collaboration.

Collaborative Decision-Making in Emergency and Disaster Management

Because of the fact that emergency management is characterized by complexity, urgency, and uncertainty (Aldunate, Pena-Mora, & Robinson, 2005; Comfort, 1999; Danielsson & Ohlsson, 1999; Moynihan, 2008) it is crucial for participating organizations to have a fast though smooth and effective decision-making process. This section of the article, first, describes the nature of decision-making in emergencies and the factors affecting the decision-making process. It then focuses on the collaborative decision-making in emergencies and identifies relevant challenges as well as opportunities for practice.

Being one of the cornerstones of emergency management, decision-making has been widely addressed by scholars of the field (Cosgrave, 1996; Flin, 2001; Janis & Mann, 1977; Rosenthal & Kouzmin, 1997; Useem, Cook, & Sutton, 2005). Some of the scholars addressed the issue at the *individual* level (Allison & Zelikov, 1999; Bigley & Roberts, 2001; Flin, Slaven, & Stewart, 1996; Flueler, 2006) with focus on behavioral tenets; others focused on *team* or group performance (Driskell & Salas, 1991; Salas, Burke, & Samman, 2001; Takada, 2004) and looked at group behavior and trends. Yet others analyzed emergency decision-making at the *organizational* level (Quarantelli, 1997; Rosenthal & Kouzmin, 1997) focusing on how organizations approach and should approach decision-making during emergencies. Since most of the decision-making processes, whether organizational, team or individual, boil down to individual decision-makers in organizations or agencies, it is quite normal that individual decision-making received the most attention.

Another distinction was in terms of the factors affecting decision-making in emergencies. The factors that were identified in this regard are complexity arising from severity of situation and involvement of several organizations in response operations (Bigley & Roberts, 2001; Carley & Lin, 1997; Sellnow, Seeger, & Ulmer, 2002); uncertainty caused by limited information about the situation and chaotic atmosphere (Cosgrave, 1996; Janis & Mann, 1977; Johnston, Driskell, & Salas, 1997; Therrien, 1995); time pressure resulting from urgency to make immediate decisions (Buchanan & O'Connell, 2006; Danielsson & Ohlsson, 1999; Flueler, 2006; Lin & Su, 1998); stress caused by severity and complexity of situation, and urgency to make consequential decision (Driskell & Salas, 1991; Janis & Mann, 1977; Paton, 2003; Wallace & De Balogh, 1985); risk needed to be taken to decide on critical and high-stake issues (Bier, Haimes, Lambert, Matalas, & Zimmerman, 1999; Buchanan & O'Connell, 2006; Janis & Mann, 1977) and previous experience concerning the case at hand (Carley & Lin, 1997; Flin, 2001; Flin, Slaven, & Stewart, 1996; Moynihan, 2008). Contrary to the previous experience, which facilitates decision-making process, all other items mentioned above would have negative, if not debilitating, impact on the ultimate decision taken by emergency managers.

In terms of tools and techniques that would improve and facilitate decision-making in emergencies, the literature generally focuses on training (Crichton, Flin, & Rattray, 2000; Inzana, Driskell, Salas, & Johnston, 1996; Lin & Su, 1998), decision support systems (Lindell, Prater, & Peacock, 2005; Wallace & De Balogh, 1985), and simulation (Paton, 2003; Preston & Cottam, 1997). These techniques generally aim to build organizational capacity and individual professional skills in order to reduce the negative impact of above-mentioned factors affecting decision-making process in the context of emergency management.

The literature also presented a number of decision-making models which varied in terms of the factors included in the model. This variation can be summarized in the form of two continuums. The first continuum is the analytic-heuristic continuum, on the one extreme of which is decision-making based solely on data analysis and technical information (Allison & Zelikov, 1999; Flin, 2001; McDaniels, Gregory, & Fields, 1999; Smith & Dowell, 2000); on the other extreme, however, is decision-making based solely on heuristic judgment (Forster, 1999; Gigerenzer & Todd, 1999; Lin & Su, 1998; Moynihan, 2008) and resulting from and supported by previous experience or simply because of situational desperation. The second continuum encompasses variation in the number of involved decision-makers, at one extreme of which is just one individual or just one organization (Flin, 2001; Useem, Cook, & Sutton, 2005), and at the other extreme is the maximum number of individual decision-makers or organizations in specific context (Smith & Dowell, 2000).

While the literature is not limited to above-mentioned categories, the main theme of the suggestions and recommendations drawn from the literature focuses on the need to utilize both analytical and heuristic tools in decision-making during emergencies. Emergency situations are complex and dynamic that they cannot be managed based solely on decision-makers' bounded rationality (Simon, 1996) and they may end in failure if relying only upon analytical calculations and analyses (Garrett, 2004). Because emergency management is more of a practical nature, a vast number of articles focus on the dynamics of operational side of the field.

Because if the uncontrollable and consequential nature of disasters affecting masses of people and requiring involvement of various sectors, organizations, and stakeholders, collaboration plays an important role to achieve ultimately successful results. It is equally inevitable for different entities to collaborate in order to increase response effectiveness and reduce casualties. When both areas of decision-making and collaboration in emergency management are concerned, it becomes a more difficult job for organizations to address. When decisions are to be made by a certain agency or coordinating body, it is crucial to have a comprehensive mechanism that would facilitate and enhance decision-making process through various administrative, structural, and behavioral changes and adjustments (Raiffa, Richardson, & Metcalfe, 2002). These organizational needs, adjustments, and management techniques have varied in terms of several aspects.

Based on the level of collaboration, of course, the level of required inter-operability also changes (Diniz, Borges, Gomes, & Canos, 2005; Mendonca, Jefferson, & Harrald, n.d.). Inter-operability is the dynamic exchange and utilization of different sources, tools, and mechanisms that would add to quality of decisions to be made. This is primarily based on the uncertainty reduction fact mentioned

above, which states that the more information one gets, the higher the possibility for high-quality and low-risk decisions. Active implementation of inter-operability, however, depends on the commitment level of the organization to collaborate as it was stated previously in the context of collaboration. Inter-operability requires a certain level of sacrifice in terms of organizational limitations on decisions. Improvisation and flexibility during emergency situations are one of the factors advocated by scholars of the literature (Turoff et al., 2008).

The first theme resulting from the literature is the relative propensity of organizations to focus on the importance of communication during emergency situations. This is quite understandable due to the fact that decision-making is primarily exercised through inter-entity interaction to communicate ideas to decide on an issue. Organizations understand that having strong and comprehensive tools of communication will enhance their "connectivity," which is defined as how reachable organizations are (Aldunate, Pena-Mora, & Robinson, 2005).

Communication, thus, is the basis of collaborative decision-making during emergencies, because it is responsible for the "transfer, receipt, and integration of knowledge across participants" (Weber & Khademian, 2008, p. 334). This, in turn, brings in another issue, that is, how organizations can have the most comprehensive and effective communication tools to develop and facilitate their decision-making. The literature also focuses on decision-support systems and technological tools such as Geographic Information Systems (GIS), or other web-based initiatives performing through different channels. It is also the communication commitment level of the organizations, though, that would determine the tools and techniques of communicative collaboration. Turoff et al. (2008) present a scale comprising five levels of commitment: "Competitive — no trust in passed information; Informative — honest information exchanged on what is being done by each party; Coordination — mutual scheduling of what tasks each party is doing when; Cooperative — mutual agreement on what tasks each party is going to do; and Collaboration — mutual agreement to work together on the same tasks" (p. 468). Based on this scale, collaborative decision-making in emergencies would mostly fit the last point on the scale, namely to be involved in collaboration. The level of commitment mainly depends on capacity and goal assessment of organizations to be involved in collaboration.

The second issue concerning collaborative decision-making is the importance of information. The quality of information received can have negative impacts if it is not managed correctly. In this regard, there are several factors affecting the quality of information, which can be summarized under three categories based on the work of Danielsson and Ohlsson (1999). The quality depends on the reliability, availability, and relevance of the information, among which reliability plays a consequential role, since information

coming from incompetent sources is error-prone. While information availability may result in information scarcity, a relevance problem may result in information overload (Diniz et al., 2005). Therefore, information quality and information load are two separate continuums that need special attention in the context of collaborative decision-making. As in most of the cases, information load should be optimized, while quality, based on above-mentioned criteria, should be as high as possible.

This information/knowledge management issue, however, should also be utilized in regard to the type of information acquired. Diniz et al. (2005) categorize knowledge as "past personal," "past formal," and "contextual knowledge" (p. 1189). While the first suggests decision-makers' experience, the second focuses on prescribed rules and procedures. Contextual knowledge, on the other hand, is the most important one, because it is the most dynamic and should be updated quite often. The best option, however, is to focus on the combination of all three with special attention on ever-changing contextual knowledge (Dinizet al., 2005).

Third, the question of who decides in such situations is of great importance and has received much attention in the literature. The literature basically says that since the form of decision-making is collaborative, the decision-making body is the ultimate summation of all the voices (stakeholders) involved in the dynamic exchange of ideas and alternatives. This is true even if a certain coordinating body is in place, because collaborative decision-making values alternative perspectives and contributions of different parties (Hills, 2004).

Theoretical Framework

Based on the literature a theoretical framework is developed (see Figure 1). The framework incorporates basic factors affecting collaborative decision-making during emergency, crises or disaster situations. These factors are mainly the *system* under which organizations and agencies operate and perform their daily duties; the *environment* surrounding the agencies which is primarily characterized by situational factors pertaining to emergencies; the *capacity* of the participating actors to adequately perform duties of collaborative nature; and, the *actors* and their characteristic preferences as well as relationships among themselves.

These factors are assumed to affect the cognitive and operational base for decision-making, namely the way organizations perceive the emergency and its requirements, and the way they operate and perform their functions based on those perceptions. The factors would create an environment, preferably collaborative, determining the success or the failure of collaboration in terms of decision-making, which, if properly fitted, would produce a common decision based on consensus among members participating in collaborative decision-making. The following section covers EMAC's
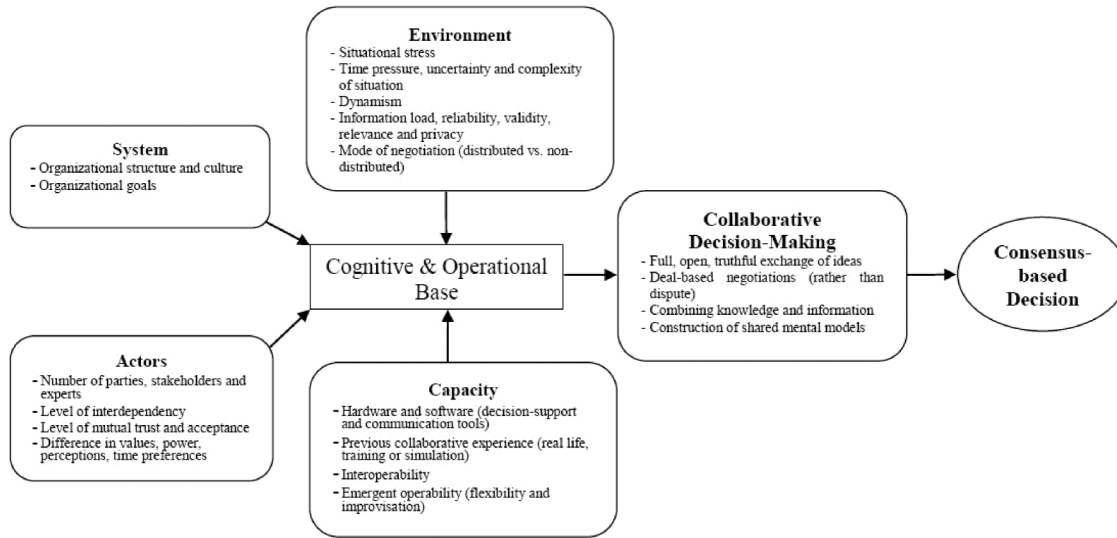
FIGURE 1   Theoretical Framework of Collaborative Decision-Making in Emergencies.

structure and operations followed by analysis of its performance, based on a theoretical framework, during Hurricanes Katrina and Rita,.

EMAC STRUCTURE AND OPERATIONS FOR COLLABORATIVE DECISION-MAKING

The Emergency Management Assistance Compact (EMAC) is a state-to-state mutual aid agreement that facilitates interstate resource sharing during emergency situations. It was begun as a regional compact in 1993 between southeastern states. It was ratified by the U.S. Congress in 1996 as a Public Law, and today all states, the District of Columbia, Puerto Rico, and the U. S. Virgin Islands are members of the agreement. EMAC is administered by the National Emergency Management Association (NEMA), and NEMA assigns an EMAC Coordinator and EMAC Senior Advisor (EMAC, 2007).

NEMA's National Response and Recovery Committee assigns a member state yearly as Chair of EMAC Operations Subcommittee, which is assisted by a 19-member Executive Task Force (ETF): The current and immediate past Chair, the succeeding Chair-elect, three at-large ETF members appointed by the Chair, the EMAC Coordinator, the EMAC Senior Advisor, and ten Lead State Representatives elected from ten Federal Emergency Management Agency (FEMA) regions. The Subcommittee develops various policies and guidances. EMAC ETF may be assisted by ad hoc task forces in the event certain projects emerge (EMAC, 2007; Kapucu, Augustin, & Garayev, 2009).

When emergencies occurs and an emergency is declared by the governor of an affected state, the EMAC Operations Subcommittee becomes the Chair of the National Coordination Group (NCG), which is responsible for coordinating active emergency response operations on behalf of EMAC. The NCG, in turn, is also responsible for constructing an EMAC Advance Team (A-Team) composed of other states' EMAC members.

The A-Team then deploys to the affected state to analyze the situation and provide a needs assessment, after which Requests for Assistance (REQ-As) are sent to other member states via fax, telephone, e-mail, or the EMAC broadcast system. Other states, on the other hand, send the requesting state a list of all available resources and relevant costs they require as reimbursement. After negotiation with the help of the A-Team in the requesting state, an Authorized Representative signs the agreement, after which deployment of resources from offering states starts. When the mission is completed the deployed resources are demobilized, followed by a reimbursement stage (EMAC, 2006).

EMAC System in Collaborative Decision-Making

Organizational Structure and Culture

The organizational structure and culture in the context of collaborative decision-making in emergencies are important because of the agency actors' habits and preferences while performing their duties. Certain organizations tend to be more flexible, for example, while others tend to be more rigid in terms of their structure, command and control, and management. EMAC in this sense presents a very sophisticated and simple picture. First of all, a relatively small administrative body composed of around 20 members lets the issues be administered in a more direct and clear way. This is especially important for having a focused approach to the issues at hand. According to the EMAC after-action report, in this regard, issues were clearly handled from the

declaration of an emergency to deployment of resources to the affected area (EMAC, 2006). This kind of structure and organizational culture, especially vis-a-vis collaboration with other states, does help EMAC produce decisions on a collaborative basis.

One of the noticeable aspects of EMAC, moreover, is that its Advance Teams (A-Teams) are organized on an ad hoc basis. What is more, these ad hoc teams and the whole supporting staff of the National Coordinating Group are ever-changing, based on the fact that the leadership is changed from one state to another every year in September. While this may be a positive aspect because it allows for new approaches and alternative views, it may also threaten the stability of institutional knowledge and, thus, lead to paralysis of the whole system. According to the report, for example, the change of leadership from New York to New Mexico was seamless; it might, nevertheless, affect leadership in a negative way especially because of the stress caused by the hurricane season when the change occurred (EMAC, 2006). In short, the dynamic administrative staff and personnel may be debilitating on producing stable and focused decisions if the changes are not controlled properly.

Organizational Goals

Organizational goals may limit the decisions taken by an organization. For example, many people think that EMAC is an organization that deals with search and rescue itself. The truth is that EMAC is only an intermediary tool to mobilize such resources from states where such resources are available and offered (EMAC, 2006). Thus, EMAC's mission is limited to providing a forum for negotiations to complement the federal response.

It is also the type of governance model that can result in different approaches to certain problems. EMAC often times deals with state and local government agencies at the same time, in which case the former has a more general and cursory, while the latter has a more immediate and thorough, involvement in the issues. In other words, while still depending on the scope of the disasters, state governments are generally not direct or initial responders, thus making less informed and burden-free decisions. Such a situation may result in discrepancies between state and local operations and implementations.

Lastly, the sectoral differences also impact the collaborative decision-making process. This factor similarly affects the extent to which the organizations involved in response operations would engage in collaborative decision-making. The decisions they would approve would be proportional to their goals, paving the way to a sometimes less cooperative decision-making environment. It is a challenge for EMAC, thus, to reconcile the different approaches and arrive at common though not-cursory decisions in regard to complex and urgent situations during emergencies.

Environment in Collaborative Decision-Making

Situational Stress, Time Pressure, Uncertainty, and Complexity of Situations

This is the item that generally has a negative effect on the operating agencies (Driskell & Salas, 1991). EMAC is not an exception, and its operations may be influenced by stress, time pressure, uncertainty, and the complexity of the disaster situation. For example, during negotiations on the cost of the resources that would be sent by an offering state, the requesting state may simply easily approve certain decisions without extensive research just because of the stress and pressure the situation imposes, thus, having a disturbing affect on the whole collaboration process. The report presents a successful picture of the operations especially in terms of their timeliness and accuracy. Additional emphasis should be put on the on-site circumstances and decision-making process, which is characterized by the relative flexibility of participating agencies in terms of immediate decisions to be taken. It is vital that on-site agency representatives are cooperative and flexible enough to respond to urgent situations.

Informational Load, Reliability, Validity, Relevance, and Privacy

This item concerns mainly information exchange and can affect overall organizational and network performance (Carley & Lin, 1997). It is especially an important factor for such communication-based entities as EMAC. From the declaration of the emergency to demobilization of resources EMAC primarily and extensively uses e-mail, fax, and phone communication (EMAC, 2006). Especially under stressful situations incoming and outgoing information may be severely affected, creating additional burdens for A-Teams and related personnel on requesting states. For example, one of the issues personnel in requesting states face is the need to assess all incoming information from offering states in order to evaluate and negotiate the terms of agreement that should ultimately be signed. This may result in information overload for the requesting state, thus also creating room for irrelevant information.

At the same time, the inter-jurisdictional nature of operations does limit the amount and form of information provided by respective agencies. Privacy can also significantly decrease the willingness to share information even if a state of emergency exists. The EMAC operation teams sometimes also receive inaccurate and unreliable information because of complicated on-site conditions and reports and claims from the affected citizens, which increase the responsiveness but decrease resources and time otherwise available for other urgent purposes. These factors should be taken into account when attempting to provide the most effective and efficient decisions concerning the situation at hand, and certain information filtering and/or management is imperative to speed the process (Diniz et al., 2005).

Mode of Negotiation (Distributed vs. Non-Distributed)

The basic mode of negotiation is distributed negotiation, which requires additional skills and brings additional burdens (Aldunate, Pena-Mora, & Robinson, et al, 2005). Distributed decision-making takes a lot of time to reach an agreement, especially because of the time spent on sharing information. It is very important to get an answer from offering states so that the requesting state can immediately evaluate offers and deploy necessary resources. Moreover, distributed decision-making makes it difficult to synchronize all information and provide situational awareness. According to the report, there were several uncertainties regarding the requesting state's ultimate decision about the offers provided by offering states, and offering states generally did not know whether their help was still needed or not.

Capacity in Collaborative Decision-Making

Hardware and Software (Decision-Support and Communication Tools)

Though EMAC does not have any decision-support system, it relies extensively upon communication tools, with EMAC Broadcast the most used. This is a system developed by EMAC, through which EMAC personnel can send information using e-mail. Resource requests are mainly performed through this system, which is supported by a resource tracking system as well. Because of communication's being a cornerstone of EMAC operations, further improvements are expected in this area to facilitate the negotiation process, according to the report.

Previous Collaborative Experience (Real Life, Training, or Simulation)

While this item deals with collaborative experience, it may be generalized to experience concerning EMAC operations as well. The report states that there were many professionals and experts who did not have any idea about EMAC and its operations. Moreover, some of the points of contact (POCs) appointed to positions, during the main officers' off-duty hours, to negotiate and decide on the issues collaboratively were unfamiliar with EMAC and how to proceed with the requests and offers from states. Therefore, people appointed for such critical positions like negotiation and decision-making should be aware of the expectations inherent in the position.

Interoperability

Interoperability is the term describing the ability of organizations to adjust themselves to various environments, situations, tools, and systems. EMAC is actually designed to adjust to various settings especially because of the dynamic nature of emergencies and actors it deals with. The problems that can arise in such situation are the different organizational cultures and preferences of people who have never worked together. Moreover, the report states that unfamiliarity with EMAC operations and procedures slows down the whole process.

Emergent Operability (Flexibility and Improvisation)

Emergent operability is characterized by flexibility and improvisation. In this regard, EMAC is already a suitable entity, because it is a relatively small and mobile agency with a fluid staff structure. In addition, there is no one-size-fits-all strategy or procedure when dealing with negotiation-based decision-making. Lastly, EMAC is adjusting itself to the relevant states and actors where it operates, providing for the highest level of flexibility and improvisation.

Actors in Collaborative Decision-Making

Number of Parties

The number of parties plays an important role in determining the ultimate decision after negotiation. The number of parties involved in negotiation to determine the need for resources and to evaluate the cost of resources offered by other states is very small, thus allowing for less critiquing and conflict and for more cooperation and collaboration. The report does not state any direct problem concerning the number of parties; nevertheless, such disasters like Hurricane Katrina require orderly and careful negotiation and collaboration with not only states but also other government, for-profit, and non-profit organizations.

Level of Interdependency

In the context of EMAC, the level of interdependency determines the level of conflict that parties may have during negotiation. Since the resources deployed through EMAC are not mandatory and are requested, offered, and negotiated on a voluntary basis, the level of interdependency is low, thus allowing for alternative options to for the requesting state. On the other hand, it makes it easier for decision-makers to leave an option at hand, thus prolonging the search for the best option, because there is a low level of interdependency resulting in less collaborative efforts. While it is impossible to expect a consolidated and unique approach on the agencies' side, collaboration-oriented communities produce stronger and more effective strategies to cope with disasters (Kapucu, 2008).

Level of Mutual Trust and Acceptance

Trust-based partnership and collaboration is important for effective emergency response and recovery operations (Kapucu, 2006). Though collaborative decision-making in the context of EMAC is an accepted phenomenon, it is difficult to talk about a high level of mutual trust and acceptance among the members participating in a negotiation process and trying to reach consensus. This is especially true because of different and frequently changing actors the requesting state and A-Team have to deal with during emergencies. Each emergency situation presents a unique mixture of organizations and agencies that hardly know and trust each other. Therefore, this may create problems, especially during cost negotiation.

It is difficult to measure the level of trust among participating organizations during emergencies. Organizations that have previously been involved in certain collaborative efforts, and thus have had dialogue and built trust, tend to be more cooperative and productive in collaborative decision-making processes (Ansell & Gash, 2008). EMAC should invest in trust-building at least at the state level, and more at the local level to break the barriers to effective collaborative decision-making process.

Difference in Values, Power, Perceptions, and Time Preferences

The randomness of the situation and actors in emergency situations results in participating actors with completely different organizational cultures, preferences, and views about how to deal with the situation at hand. This is problematic because such varied groups of actors hardly agree on critical issues, thus slowing down the negotiation and decision-making processes. What is more, some federal organizations may be more powerful and influential than, for example, non-profit organizations, during the negotiations. A more balanced and equal-view group of decision-makers would be a plus in terms of more quickly arriving at a decision during emergency situations.

DISCUSSION

All factors discussed previously affect collaborative decision-making, and actually determine the level of collaboration among decision-makers. After combining knowledge, experience, and information received from others, actors are expected to have a shared understanding about the whole issue at hand and, thus, constructively contribute to the negotiation process in order to arrive at a consensus-based decision. Such a decision would be a result of open and deal-oriented dialogue. Though EMAC had slight problems regarding construction of shared mental models, overall, it possesses the necessary tools and expertise to facilitate collaboration-oriented negotiations among the parties involved in the process. As a tool to share resources among states, EMAC can quickly and seamlessly arrange alternatives and solve the problems of shortfalls during catastrophic disasters like Hurricane Katrina.

In general, collaborative decision-making in the EMAC system, in terms of deployment of resources and personnel, was effective and worked well. However, some issues and problems were identified with EMAC's response to hurricanes in 2005. EMAC is an interstate mutual aid agreement required in complex interstate and interorganizational actions. These complex interactions of EMAC processes deserve some close scrutiny.

The home state EMAC representatives, people on the ground, did a very good job without a clear direction, national level EMAC structure was fast and effective in identifying critical needs and matching individuals to immediate areas needing attentions, and EMAC A-Team and personnel easily fit into the existing system. Poor communication and interoperability, miscommunications, lack of coordination among federal, state, local, EMAC, and deployed personnel, and a long time to deploy EMAC resources were the problems related to EMAC's collaborative decision-making in response to the disasters. Despite the positive and negative experiences of EMAC deployment, most of the emergency managers at the different levels of government wanted to be deployed via EMAC in the future in response to major disasters.

In order to increase the collaborative decision-making in response to emergencies and disasters by EMAC, it is recommended that there be regular training for both trainers and operators, a standard set of checklists for A-Team operations should be created, member states should be automatically informed when a resource request is filled and should identify the designated assisting states, rapid response A-Team capability should be developed, and a cooperative relationship established with professional associations whose members traditionally engage in disaster operations and non-profit organizations active in disasters. EMAC should also be included in state and local government personnel training and in all disaster training exercises.

CONCLUSION

Based on the EMAC's performance analysis, it is safe to say that EMAC's collaborative decision-making practices were relatively satisfactory, especially because of the achievements stated in the report and acknowledgments from several other government agencies. Nevertheless, some improvements are needed and expected in several areas.

The first should be the improvement of communication tools, basically because EMAC is primarily dependent on effective communication technologies. In this regard, special attention should be paid to information synchronization tools and technologies. Effective decision-making is possible when relevant participants receive timely and accurate information thoroughly analyzed and filtered for ultimate decision-makers' convenience.

Second, it is important to have everyone at the same table arrive at less distorted and more supported decisions. Distributed decision-making is one of the factors negatively affecting the overall decision-making process, and when possible should be substituted by trustful, inclusive, and open dialogue. When such circumstances are impossible, interoperability should be the first issue to which the agencies should direct their energies.

Third, when distributed decision-making is concerned, it is important to let EMAC representatives be as flexible as possible with the less conservative discretion for improvisation. Such discretion, however, should be supported by experts with previous experience in dealing with time-sensitive extreme events. While the abundance and randomness of organizations participating in response operations are positive factors overall, it is the distinctive skillfulness of the coordinating body, in this case EMAC, that would ultimately produce effective courses of action.

Finally, it is important for EMAC to have a constant policy that would target as valuable difference minimization and trust building. Inter-agency networks, not only during and after disasters, but also in routine times would be a positive step toward establishment of shared mental values and eradication of discrepancies arising from different values and organizational goals. The open and truthful exchange of ideas is the ultimate goal of such dialogue, which would facilitate coordination and enhance collaboration during emergency decision-making processes and response operations.

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